AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listing of claims in the application:

LISTING OF CLAIMS:

1. (Currently amended) A system of alignment marks formed on a substrate, the substrate to be used in a photolithographic system having first and second alignment signal sources and signal detectors, the alignment marks comprising:

a first region configured to provide a first signal to the first signal detector in response to the first alignment signal source having a width Z; and

a second region configured to provide a second signal to the second signal detector in response to the second alignment signal source having a width Z,

wherein the first signal determines multiple first coordinates of an aligned position of the substrate, the second signal determines multiple second coordinates of an aligned position of the substrate, and the substrate is in a coarse aligned position with the photolithographic system when one of the multiple first coordinates and one of the multiple second coordinates correspond to a maximum received signal strength at the first signal detector and the second signal detector, respectively,

wherein the first region and the second region are an X mark diffraction pattern and a Y mark diffraction pattern, respectively,

wherein the X mark diffraction pattern further comprises a segment of a Y mark in the X mark and the Y mark diffraction pattern further comprises a segment of an X mark in the Y mark,

wherein a segment of a Y mark and a segment of the X mark are removed,

wherein each segment removed corresponds to regions of the X mark and Y mark that cause false alignments,

wherein an approximate center of a Y mark in the X mark is determined from the width Z of the first alignment signal source and the maximum received signal strength at the first signal detector, and

wherein an approximate center of the X mark in the Y mark is determined from a width Z of the second alignment signal source and the maximum received signal strength at the second signal detector.

2. (Withdrawn) The system of alignment marks of claim 1, wherein the first region and the second region are an X mark diffraction pattern and a Y mark diffraction pattern, respectively.

3. (Withdrawn) The system of alignment marks of claim 2, wherein the X mark diffraction pattern further comprises a segment of a Y mark in the X mark and the Y mark diffraction pattern further comprises a segment of an X mark in the Y mark.

4. (Previously amended) The system of alignment marks of claim 1, wherein the segment of an X mark in the Y mark and the segment of a Y mark in the X mark are located at each end of the X mark and Y mark, respectively.

5. (Previously amended) The system of alignment marks of claim 1, wherein the segment of an X mark in the Y mark and the segment of a Y mark in the X mark are located in a middle portion of the X mark and Y mark, respectively.

6. (Withdrawn) The system of alignment marks of claim 3, wherein a segment of a Y mark and a segment of the X mark are removed.

7. (Previously amended) The system of alignment marks of claim 1, wherein a segment of the Y mark and a segment of the X mark are removed and replaced by segments of a different orientation than the X mark and the Y mark, respectively.

8. (Withdrawn) The system of alignment marks of claim 6, wherein each segment removed corresponds to regions of the X mark and Y mark that cause false alignments.

9. (Withdrawn) The system of alignment marks of claim 7, wherein each segment removed corresponds to regions of the X mark and Y mark that cause false alignments.

10. (Original) The system of alignment marks of claim 7, wherein the segments of different orientation are located from +/-45° to +/-90° relative to the X mark and the Y mark.

11. (Currently amended) A method for searching and aligning alignment marks formed on a substrate in a diffraction pattern alignment system, comprising:

locating a segment of a Y mark in an X mark;

illuminating the segment of a Y mark in an X mark with a Y-alignment signal source having a width Z;

measuring received signal strength of the diffraction pattern at a first signal detector; moving the X mark in an X-direction;

repeating the illuminating, measuring and moving until the received signal strength of the diffraction pattern at the first signal detector is zero;

determining a location of an approximate center of the segment of a Y mark in an X mark as a maximum of the measured received signal strength;

illuminating the X mark with the X-alignment signal source;

detecting multiple aligned positions received at a second signal detector as a result of illuminating the X mark;

searching the multiple aligned positions detected for a single aligned position in the X-direction that corresponds to the location of the approximate center of the segment of a Y mark in an X mark; and

selecting an aligned position of the X mark in the X-direction in accordance with the single aligned position that corresponds to the location of the approximate center of a Y mark in an X mark,

wherein the approximate center of a Y mark in an X mark is further determined from the width Z of the Y-alignment signal source and a location of the maximum of the measured received signal strength.

12. (Original) The method of claim 11, wherein moving the X mark in an X-direction is performed by moving the X mark in relation to the Y-alignment signal source by a specified amount in the X-direction until the Y-alignment signal source has passed the segment of a Y mark in an X mark.

13. (Original) The method of claim 11, wherein selecting the aligned position occurs when the maximum of the received signal strength is greater than or equal to a predetermined threshold.

14. (Currently amended) A method for searching and aligning alignment marks formed on a substrate in a diffraction pattern alignment system, comprising:

locating a segment of an X mark in a Y mark;

illuminating the segment of an X mark in a Y mark with an X-alignment signal source with a width Z;

measuring received signal strength of the diffraction pattern at a first signal detector;

moving the Y mark in a Y-direction;

repeating the illuminating, measuring and moving until the received signal strength of the diffraction pattern at the first signal detector is zero;

determining a location of an approximate center of the segment of an X mark in a Y mark as a maximum of the measured received signal strength;

illuminating the Y mark with the Y alignment signal source;

detecting multiple aligned positions received at a second signal detector as a result of illuminating the Y mark;

searching the multiple aligned positions detected for a single aligned position in the Y-direction that corresponds to the location of the approximate center of the segment of an X mark in a Y mark; and

selecting an aligned position of the Y mark in the Y-direction in accordance with the single aligned position that corresponds to the location of the approximate center of an X mark in a Y mark,

wherein the approximate center of the X mark in a Y mark is further determined from the width Z of the X-alignment signal source and a location of the maximum measured received signal strength.

15. (Original) The method of claim 14, wherein moving the Y mark in the Y-direction is performed by moving the Y mark in relation to the X-alignment signal source by a specified amount in the Y-direction until the X-alignment signal source has passed the segment of an X mark in a Y mark.

16. (Original) The method of claim 14, wherein selecting the aligned position occurs when the maximum of the received signal strength is greater than or equal to a predetermined threshold.